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EFFECT OF INGESTION OF GARCINIA KOLA SEED ON ERYTHROCYTES IN RABBITS

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ABSTRACT
The aim of the study is to investigate the effect on RBC of ground untreated *Garcinia kola* seed in rabbits. Twenty four unsexed rabbits with average weight of 842.62+ 57.5g and aged between 42 and 49 days were randomly assigned to four treatments of T_1 (control, no bitter kola) T_2 (1g bitter kola/kg body weight), T_3 (2g bitter kola/kg body weight) and T_4(3g bitter kola/kg body weight) in a completely randomized design. Each of the treatments was replicated thrice with two rabbits per replicate. They were given graded levels of bitter kola treatments for four out of seven days weekly for 12 weeks excepting T_1. At the end of the experiment blood samples were collected and the red blood cell (RBC) concentration, packed cell volume (PCV) and haemoglobin concentration values were determined. The results showed that T_4 and T_3 were highly significant ($P<0.01$) in heamoglobin concentration. In the same vein T_4, T_3 and T_2 demonstrated highly significant difference ($P<0.01$) in RBC counts. However, there was no significant difference ($P>0.05$) in PCV among all the treatments. None of the values fell below the normal physiological range of the experimental animals. This shows that *Garcinia kola* which has flavonoids as its active constituent can enhance erythropoiesis and as well has no long term significant toxicological implication with respect to the above concentrations.

KEYWORDS: *Garcinia kola* , haemoglobin concentration, erythropoiesis, flavonoids, toxicological implication

INTRODUCTION

The tolerance of orthodox antibiotics in the recent time has posed more questions than answers (Hong-xi and Song, 2001). Antibiotic cross resistance manifests in humans after consuming meat from animals earlier placed on antibiotic chemotherapy in which the withdrawal period for such antibiotic had not been met before slaughter (Walton, 1996).

Garcinia kola seed known as bitter kola in Nigeria is commonly called "*Namiji goro*" in Hausa and "*Akilu*" in Igbo (Esomonu, *et al.,* 2005) is used in traditional medicine for various therapeutic purposes based on the pharmacological effects of the active components (flavonoid) in the seed and other parts of the plant (Braide and Vittrotio, 1989). *Garcinia kola* also serves as a guinea-worm remedy (Lewis, *et al.*, 1977), and employed in the treatment of diabetes (Tita, *et al.,* 2001). Wang, *et al*, (2000) also reported that flavonoid supplements are likely to be beneficial for long-term health since it acts as a potent antioxidant.

The seed has also been shown to have antibiotic property by Hong-xi and Song, (2001) and anti-inflammatory property (Braide, 1990) as well as antimicrobial activity (Madubuyi,1995). Bearing in mind that much work has not been done in *Garcinia kola*,I was moved to investigate its effect on erythrocytes of rabbits.

MATERIALS AND METHODS

EXPERIMENTAL ANIMALS AND MANAGEMENT

Twenty four rabbits with average weight of 842.62+57.5g and aged between 42 and 49 days were divided into four treatments of T_1 (control, no bitter kola), T_2 (1g bitter kola /kg body weight), T_3 (2g bitter kola/kg body weight), and T_4 (3g bitter kola/kg body weight). They were replicated into three with two rabbits each. The rabbits in T_2, T_3 and T_4 were given ground bitter kola seed as prescribed above every four out of seven days weekly for twelve weeks. The ground bitter kola was suspended in 30ml of water and served to them per day after water deprivation for about 2-3 hours. Within a spell of few to forty five minutes, they had consumed the whole treatment. Then commercial Guinea Feed with

TABLE 1.0: HAEMATOLOGICAL PARAMETERS OF RABBITS MEDICATED WITH GRADED LEVELS OF BITTER KOLA

Blood parameters	T^1	T^2	T^3	T^4	SEM
Hgb (g/dl)	11.70^c	11.10^d	13.03^b	13.80^a	0.16
PCV(%)	41	41	42	44	0.65
RBC(/mm^3)	$5.60x10^{6b}$	$6.93x10^{6a}$	$6.95x10^{6a}$	$7.10x10^{6a}$	0.13
WBC (/L)	$6.20X10^9$	$6.20X10^9$	$6.0X10^9$	$6.10X10^9$	0.09

abc:rows with different superscripts on the same line are statistically different($P<0.05$).

crude protein of 14.5% and metabolisable energy of 2300 kcal/kg was measured and served them. Also clean drinking water (tap) was given *ad-libitum*.

DATA COLLECTION AND ANALYSIS

At the end of the experiment occult blood was collected via the ear vein from each treatment.The blood was used to determine red blood cell (RBC) count, packed cell volume (PCV), and haemoglobin (Hgb) concentration in the laboratory based on the method described by Schalm, *et al,* (1975).

STATISTICAL ANALYSIS

The average values of the indices were determined and the standard errors of mean calculated. Values got were compared with those of control and where differences existed in means, it was separated using Fisher's Least Square Difference (F-LSD). These were used to compute the levels of significance at $P<0.05$ and $P<0.01$.

RESULTS AND DISCUSSION

HAEMATOLOGICAL PARAMETERS

Table 1 shows that there was a gradual increase in haemoglobin as the bitter kola levels increased from T_2 (11.1g/dl) to T_3 (13.03g/dl) and T_4 (13.8g/dl) while rabbit in T_1 has 11.7g/dl of haemoglobin. Rabbits on T_3 and T_4 showed highly significant difference ($P<0.01$) in treatment effect when compared with those on T_2 and T_1. There was no significant difference ($P>0.05$) when T_3 and T_4 were compared. Also the same significance ($P>0.05$) existed when T_1 and T_2 were compared.

The PCV showed no significant difference ($P>0.05$) due to the treatments when rabbits on T_1(41%), T_2(41%), T_3(42%) and T_4(44%) were compared. Although this shows a progressive increase in PCV as the treatment increased in concentration. The RBC counts showed a highly significant difference ($P<0.01$) in treatment effects of bitter kola when rabbits on T_2 ($6.93x10^6$RBC/mm^3) T_3 ($6.95X10^6$RBC/mm^2), and T_4 ($7.10X10^6$RBC/mm^3) were compared with T_1($5.6X10^6$RBC/mm^3). However, there was no significant differences ($P>0.05$) when treatment effects of bitter kola on RBC were compared among T_2, T_3 and T_4. All fell within the normal physiological range of rabbits as established by Mitruka and Rawnsely,(1977) and Ross *et al,* (1978).

The steady rise in the values of PCV, RBC and Hgb concentration as the bitter kola seed concentration increased might be due to the antioxidant activity of flavonoid (Bravo,1998, and Wang, *et al.,* 2000) which was present in the blood due to *Garcinia kola* seed intake thereby elevating the total antioxidant capacity of the blood. The gradual steady rise in RBC count could also be as a result of increasing

freedom from disease since Brown and Clime, (1991), opined that increased RBC values are associated with high quality protein and with disease free animals.

The higher value obtained in haemoglobin concentration in T_1 (11.7g/dl) compared to T_2 (11.1g/dl) could either be ascribed to idiosyncrasy or due to complexes which flavoniod forms with reactive metals such as iron, zinc and copper thereby reducing the rabbits' nutrient absorption (Siegenberg, *et al.*,1991). This happened since iron is bound in the complex which is a major component of haemoglobin. The same explanation goes for the similarity in PCV values of T_1 and T_2 since haemoglobin has a direct relationship with PCV. The highly significant difference ($P<0.01$) in RBC counts obtained from rabbits on graded bitter kola treatment could probably be that there was compensation when ageing RBCs were destroyed leading to release of some iron which were in turn was salvaged and transported to the erythroid cells of the bone marrow for new haemoglobin and RBC syntheses (Conley, 1974).

Though there were varieties in haematological values, none fell below the normal physiological range of the experimental animals. This agrees with the work of Kou, (1997) who found no significant side effects evidenced from regular consumption of polyphenol or flavonoid containing dietary supplements. In conclusion, the constituent of *Garcinia kola* seed has been shown to exert no long-term significant toxicological tendency to erythrocytes rather it showed a marked tendency to increase the erythrocyte number. This is in tandem with the work of Esomonu, *et al*, (2005) who recorded increased RBC values in Wistar rats medicated with ethanol extract of *Garcinia kola* seed.

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